



Dart Aerospace Ltd.
1270 Aberdeen St
Hawkesbury, ON
K6A 1K7
Canada

Tel (613) 632-5200

644.4122

Job Sheet 175560



April 16 (ships May 9th)

Part No: 644.4122

Job Qty: 10 ea

Part Name: EC145 Fwd Crosstube Bushings



Part Weight: 0 lbs

Status: Scheduled

Priority: Medium

Job Created: 4/6/18

Job Tracking No:

Due Date: 4/16/18

Created By: Marie Lajeunesse

Type: SOLD

Description:

Note: DWG 644.4100 REV F2 IPP REV:A NEW ISSUE 16-12-07 JLM VERIFIED BY:DD

Ship Via:

Bill of Materials

Job Routing

Op No	Operation	Qty	Start Date	Due Date	Standard		Workcenter/Supplier		Sign-off
					Setup hrs	Run Hrs	Workcenter / Supplier	Lead Time	
90	Start up Operation	10 Ea		4/12/18	0.00	0.00	Start Up Machining-1		JB 18-05-02
100	Lathe Conv	10 pcs		4/16/18	0.00	33.33	Lathe Conv-1		JB 18-05-02
110	QC	10 pcs		4/16/18	0.00	0.00	QC2 Machining-1		JB 18-05-02
120	QC	10 pcs		4/16/18	0.00	0.00	QC8 Machining-1		2mm L 18/05/12
130	Outsource	10 pcs		4/16/18			ATG001-VC		CC18-5-1
140	Packaging	10 pcs		4/16/18	0.00	0.00	Packaging2		MRB/05/18
150	QC	10 pcs		4/16/18	0.00	0.00	QC6		38
160	Packaging	10 pcs		4/16/18	0.00	0.00	Packaging3-1	CEK/13/5	MAY 1 1-2018
170	QC21-SA	10 Ea		4/16/18	0.00	0.00	QC21		18/05/14

MRB/05/18

Part Op 100 - 1-TURN AS PER DWG DWG REV:

****CHECK NOTE 7***** 2- deburr and break all sharp

Descriptions: edges

130 - 1-ISSUE P/O TO ATG: P0039281 2-Anodize Black -MPP-172 Section 2.1 -Hard Anodize IAW Mil-A-8625

Type 3 Class 2 3-Certification of Conformity is required

160 - ***IDENTIFY AS PER APICAL MPP-120 BY STAMPING P# AND REV***

Job BOM

Part / Item	Component Name	Quantity	Operation	Container
M6061T6R0.625	6061-T6 Round Bar .625"	3.4100 ft (.341 ea)	90-Start up Operation	5046438

Job Allocations

Operation	Component Part	Required	Inventory	Allocated
90-Start up Operation	M6061T6R0.625	3	44	0

Part Specifications

Spec No	Description	Target/Tolerance	Limits	Type	Special Comments
1	Fwd Crosstube Bushing	0.550inches + 0.000 - 0.003	0.550 0.547	Diameter	
2	Fwd Crosstube Bushing	0.470inches + 0.000 - 0.003	0.470 0.467	Diameter	
3	Fwd Crosstube Bushing	0.500inches ± 0.010	0.510 0.490		
4	Fwd Crosstube Bushing	0.333inches + 0.006 - 0.001	0.339 0.332	Diameter	

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS <table style="width: 100%; border: none;"> <tr> <td style="border: none;">Skid-tube ☐</td> <td style="border: none;">Cross tube ☐</td> <td style="border: none;">Water Jet ☐</td> <td style="border: none;">Engineering ☐</td> </tr> <tr> <td style="border: none;">Machining ☐</td> <td style="border: none;">Small Fab ☐</td> <td style="border: none;">Prod. Eng. Coord. ☐</td> <td style="border: none;">Quality ☐</td> </tr> <tr> <td style="border: none;">Thermoforming ☐</td> <td style="border: none;">Finishing ☐</td> <td style="border: none;">Rec/Store/Packaging ☐</td> <td style="border: none;">Other ☐</td> </tr> <tr> <td style="border: none;">Large Fab ☐</td> <td style="border: none;">Composite ☐</td> <td style="border: none;">Supplier ☐</td> <td></td> </tr> </table>				Skid-tube ☐	Cross tube ☐	Water Jet ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐																																																
Skid-tube ☐	Cross tube ☐	Water Jet ☐	Engineering ☐																																																																	
Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐																																																																	
Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐																																																																	
Large Fab ☐	Composite ☐	Supplier ☐																																																																		
Date :	Step #:	QTY Effective :		MRB (QSI042) Approval																																																																
Description Work Order Deviation		Disposition		Completed By																																																																
				Lead hand / Supervisor Approval Verification																																																																
				QC / QA Coordinator Approval																																																																
Root Cause		FAULT CATEGORY																																																																		
<table style="width: 100%; border: none;"> <tr><td style="border: none;">Environment ☐</td><td style="border: none;">No Re-verification ☐</td></tr> <tr><td style="border: none;">Design ☐</td><td style="border: none;">Operator ☐</td></tr> <tr><td style="border: none;">Doc/Data ☐</td><td style="border: none;">Offset/Setup ☐</td></tr> <tr><td style="border: none;">Equip/Tooling ☐</td><td style="border: none;">Supplier ☐</td></tr> <tr><td style="border: none;">Handling/Pre ☐</td><td style="border: none;">Training ☐</td></tr> <tr><td style="border: none;">Material ☐</td><td style="border: none;">Use for Testing ☐</td></tr> <tr><td style="border: none;">Internal Transport ☐</td><td style="border: none;">Poor Information ☐</td></tr> <tr><td style="border: none;">Tribal Knowledge ☐</td><td style="border: none;">Rushing ☐</td></tr> <tr><td style="border: none;">LOA ☐</td><td style="border: none;">Product Improvement ☐</td></tr> <tr><td style="border: none;">Substation ☐</td><td style="border: none;">Process Improvement ☐</td></tr> <tr><td style="border: none;">Past Expiry Date ☐</td><td style="border: none;">Manufacturing Process ☐</td></tr> <tr><td style="border: none;">Misidentified ☐</td><td style="border: none;">Past Due ☐</td></tr> </table>	Environment ☐	No Re-verification ☐	Design ☐	Operator ☐	Doc/Data ☐	Offset/Setup ☐	Equip/Tooling ☐	Supplier ☐	Handling/Pre ☐	Training ☐	Material ☐	Use for Testing ☐	Internal Transport ☐	Poor Information ☐	Tribal Knowledge ☐	Rushing ☐	LOA ☐	Product Improvement ☐	Substation ☐	Process Improvement ☐	Past Expiry Date ☐	Manufacturing Process ☐	Misidentified ☐	Past Due ☐	<table style="width: 100%; border: none;"> <tr><td style="border: none;">Pressure/Forced ☐</td></tr> <tr><td style="border: none;">Bending ☐</td></tr> <tr><td style="border: none;">Centre Not Concentric ☐</td></tr> <tr><td style="border: none;">Cracks ☐</td></tr> <tr><td style="border: none;">Crimp/Kink/Ripple/Wave ☐</td></tr> <tr><td style="border: none;">Cuffs ☐</td></tr> <tr><td style="border: none;">Crushing ☐</td></tr> <tr><td style="border: none;">Heat Treat ☐</td></tr> <tr><td style="border: none;">Wave/Twist in Tube ☐</td></tr> <tr><td style="border: none;">Marks/Chatter ☐</td></tr> </table>	Pressure/Forced ☐	Bending ☐	Centre Not Concentric ☐	Cracks ☐	Crimp/Kink/Ripple/Wave ☐	Cuffs ☐	Crushing ☐	Heat Treat ☐	Wave/Twist in Tube ☐	Marks/Chatter ☐	<table style="width: 100%; border: none;"> <tr><td style="border: none;">Temperature/Cure ☐</td><td style="border: none;">Power Loss/Surge ☐</td><td style="border: none;">Positioned Wrong ☐</td></tr> <tr><td style="border: none;">Set-up ☐</td><td style="border: none;">Folio/Program ☐</td><td style="border: none;">Outside Dimensions ☐</td></tr> <tr><td style="border: none;">BOM/Route ☐</td><td style="border: none;">Grain ☐</td><td style="border: none;">Over/Under tolerance ☐</td></tr> <tr><td style="border: none;">Broken/Damage/Defect ☐</td><td style="border: none;">Weld ☐</td><td style="border: none;">Part Incorrect ☐</td></tr> <tr><td style="border: none;">Inspection Incomplete/Unqualified ☐</td><td style="border: none;">Wrong Stock Pulled ☐</td><td style="border: none;">Part Lost/Missing ☐</td></tr> <tr><td style="border: none;">Contamination ☐</td><td style="border: none;">Out of Sequence ☐</td><td style="border: none;">Part Moved ☐</td></tr> <tr><td style="border: none;">Countersink ☐</td><td style="border: none;">Off-set ☐</td><td style="border: none;">Drawing ☐</td></tr> <tr><td style="border: none;">Cut Too Short ☐</td><td style="border: none;">Mislabeled ☐</td><td style="border: none;">Finish ☐</td></tr> <tr><td style="border: none;">Instructions Incomplete/Unclear ☐</td><td style="border: none;">Fit/Function ☐</td><td style="border: none;">Misread ☐</td></tr> <tr><td style="border: none;">Drill Holes ☐</td><td style="border: none;">Misaligned/off center ☐</td><td style="border: none;">Turning Sequence ☐</td></tr> </table>			Temperature/Cure ☐	Power Loss/Surge ☐	Positioned Wrong ☐	Set-up ☐	Folio/Program ☐	Outside Dimensions ☐	BOM/Route ☐	Grain ☐	Over/Under tolerance ☐	Broken/Damage/Defect ☐	Weld ☐	Part Incorrect ☐	Inspection Incomplete/Unqualified ☐	Wrong Stock Pulled ☐	Part Lost/Missing ☐	Contamination ☐	Out of Sequence ☐	Part Moved ☐	Countersink ☐	Off-set ☐	Drawing ☐	Cut Too Short ☐	Mislabeled ☐	Finish ☐	Instructions Incomplete/Unclear ☐	Fit/Function ☐	Misread ☐	Drill Holes ☐	Misaligned/off center ☐	Turning Sequence ☐
Environment ☐	No Re-verification ☐																																																																			
Design ☐	Operator ☐																																																																			
Doc/Data ☐	Offset/Setup ☐																																																																			
Equip/Tooling ☐	Supplier ☐																																																																			
Handling/Pre ☐	Training ☐																																																																			
Material ☐	Use for Testing ☐																																																																			
Internal Transport ☐	Poor Information ☐																																																																			
Tribal Knowledge ☐	Rushing ☐																																																																			
LOA ☐	Product Improvement ☐																																																																			
Substation ☐	Process Improvement ☐																																																																			
Past Expiry Date ☐	Manufacturing Process ☐																																																																			
Misidentified ☐	Past Due ☐																																																																			
Pressure/Forced ☐																																																																				
Bending ☐																																																																				
Centre Not Concentric ☐																																																																				
Cracks ☐																																																																				
Crimp/Kink/Ripple/Wave ☐																																																																				
Cuffs ☐																																																																				
Crushing ☐																																																																				
Heat Treat ☐																																																																				
Wave/Twist in Tube ☐																																																																				
Marks/Chatter ☐																																																																				
Temperature/Cure ☐	Power Loss/Surge ☐	Positioned Wrong ☐																																																																		
Set-up ☐	Folio/Program ☐	Outside Dimensions ☐																																																																		
BOM/Route ☐	Grain ☐	Over/Under tolerance ☐																																																																		
Broken/Damage/Defect ☐	Weld ☐	Part Incorrect ☐																																																																		
Inspection Incomplete/Unqualified ☐	Wrong Stock Pulled ☐	Part Lost/Missing ☐																																																																		
Contamination ☐	Out of Sequence ☐	Part Moved ☐																																																																		
Countersink ☐	Off-set ☐	Drawing ☐																																																																		
Cut Too Short ☐	Mislabeled ☐	Finish ☐																																																																		
Instructions Incomplete/Unclear ☐	Fit/Function ☐	Misread ☐																																																																		
Drill Holes ☐	Misaligned/off center ☐	Turning Sequence ☐																																																																		
OTHER : ☐																																																																				

5	Fwd Crosstube Bushing	3.746inches + 0.000 - 0.003	3.746 3.743	
6	Fwd Crosstube Bushing	0.031inches ± 0.010	0.041 0.021	
7	Fwd Crosstube Bushing	45.000Degrees ± 0.500	45.500 44.500	Angle

Plex 4/6/18 11:12 AM Dart.lajeunesse.marie

DQA: _____ Date: _____

**WORK ORDER NON-CONFORMANCE / UPDATE**

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐			
Date : _____	Step #: _____	QTY Effective : _____		MRB (QSI042) Approval	
Description Work Order Deviation		Disposition		Completed By	
				Lead hand / Supervisor Approval Verification	
				QC / QA Coordinator Approval	
Root Cause		FAULT CATEGORY			
Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐	No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐	Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐	Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐	Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Misabeled ☐ Fit/Function ☐ Misaligned/off center ☐	Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐
OTHER : _____					

INSPECTION SHEET

Rev	Date	Change	Revised by	Approved
A	14.07.31	New Issue	KJ	

DQA: _____ Date: _____

**WORK ORDER NON-CONFORMANCE / UPDATE**

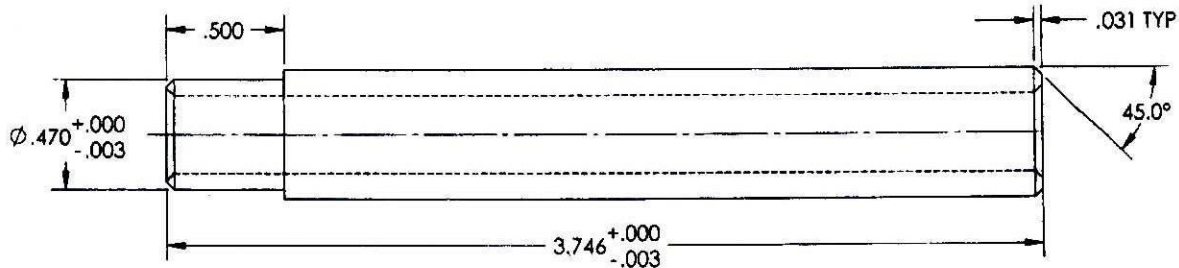
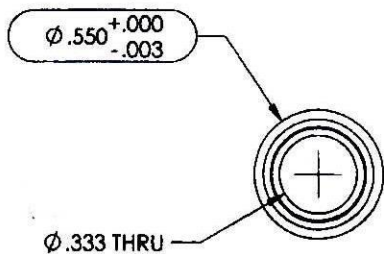
QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐					
Date :		Step #:		QTY Effective :			MRB (QSI042) Approval Completed By Lead hand / Supervisor Approval Verification QC / QA Coordinator Approval		
Description Work Order Deviation				Disposition					

Root Cause				FAULT CATEGORY			
Environment ☐		No Re-verification ☐		Pressure/Forced ☐		Temperature/Cure ☐	
Design ☐		Operator ☐		Bending ☐		Set-up ☐	
Doc/Data ☐		Offset/Setup ☐		Centre Not Concentric ☐		BOM/Route ☐	
Equip/Tooling ☐		Supplier ☐		Cracks ☐		Broken/Damage/Defect ☐	
Handling/Pre ☐		Training ☐		Crimp/Kink/Ripple/Wave ☐		Inspection Incomplete/Unqualified ☐	
Material ☐		Use for Testing ☐		Cuffs ☐		Contamination ☐	
Internal Transport ☐		Poor Information ☐		Crushing ☐		Countersink ☐	
Tribal Knowledge ☐		Rushing ☐		Heat Treat ☐		Cut Too Short ☐	
LOA ☐		Product Improvement ☐		Wave/Twist in Tube ☐		Instructions Incomplete/Unclear ☐	
Substation ☐		Process Improvement ☐		Marks/Chatter ☐		Drill Holes ☐	
Past Expiry Date ☐		Manufacturing Process ☐		OTHER : _____			
Misidentified ☐		Past Due ☐					

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF
APICAL INDUSTRIES ANY REPRODUCTION IN PART OR WHOLE WITHOUT
THE WRITTEN PERMISSION OF APICAL INDUSTRIES IS PROHIBITED.



644.4122

ORIGINAL DATE 08-01-05		APICAL INDUSTRIES	
DRAWN BY D. FABRICI		2608 TEMPLE HEIGHTS DR. OCEANSIDE, CA. 92056-3512 (760)724-5300	
CHECKED BY S. JOSEPH		PIVOT STEP ASSY	
DRAWING APPROVAL S. JOSEPH 08-29-05		DWG. NO. 644.4100	
CONTRACT NO.		REV. 07M26	SHEET 14 OF 16
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: 2 PLACE DECIMALS ±.02 3 PLACE DECIMALS ±.010 ANGLES ±.5°		SCALE: NONE	

DQA: _____ Date: _____

WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____ Date : _____ Description	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS <table style="width:100%; text-align: center;"> <tr> <td>Skid-tube ☐</td> <td>Cross tube ☐</td> <td>Water Jet ☐</td> <td>Engineering ☐</td> </tr> <tr> <td>Machining ☐</td> <td>Small Fab ☐</td> <td>Prod. Eng. Coord. ☐</td> <td>Quality ☐</td> </tr> <tr> <td>Thermoforming ☐</td> <td>Finishing ☐</td> <td>Rec/Store/Packaging ☐</td> <td>Other ☐</td> </tr> <tr> <td>Large Fab ☐</td> <td>Composite ☐</td> <td>Supplier ☐</td> <td></td> </tr> </table>				Skid-tube ☐	Cross tube ☐	Water Jet ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐	
Skid-tube ☐	Cross tube ☐	Water Jet ☐	Engineering ☐																		
Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐																		
Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐																		
Large Fab ☐	Composite ☐	Supplier ☐																			
			MRB (QSI042) Approval																		
			Completed By																		
			Lead hand / Supervisor Approval Verification																		
			QC / QA Coordinator Approval																		

Dart Aerospace Ltd.
1270 Aberdeen Street
Hamlet, ON K6A 1K7
CANADA
TEL: 1 613 632-5200
Email: sales@dartaero.com
www.dartaerospace.com

Date: 05/02/18

Container No: S067522
Part: 644.4122
Job No: 175560
Serial No/Batch: S067522
Revision: F2
Inspector:

Root Cause			
Environment	☐	No Re-verfi	☐
Design	☐	Operator	☐
Doc/Data	☐	Offset/Setu	☐
Equip/Tooling	☐	Supplier	☐
Handling/Pre	☐	Training	☐
Material	☐	Use for Testing	☐
Internal Transport	☐	Poor Information	☐
Tribal Knowledge	☐	Rushing	☐
LOA	☐	Product Improvement	☐
Substation	☐	Process Improvement	☐
Past Expiry Date	☐	Manufacturing Process	☐
Misidentified	☐	Past Due	☐

Cracks Crimp/Kink/Ripple/Wave Cuffs Crushing Heat Treat Wave/Twist in Tube Marks/Chatter	Broken/Damage/Detect Inspection Incomplete/Unqualified Contamination Countersink Cut Too Short Instructions Incomplete/Unclear Drill Holes	Surge im weiu Wrong Stock Pulled Out of Sequence Off-set Mislabeled Fit/Function Misaligned/off center
--	--	--

		Positioned Wrong Outside Dimensions Over/Under tolerance Part Incorrect Part Lost/Missing Part Moved Drawing Finish Misread Turning Sequence
--	--	---

☐ OTHER : _____



Dart Aerospace Ltd.
1270 Aberdeen St
Hawkesbury, ON
K6A 1K7
Canada

Tel (613) 632-5200

PURCHASE ORDER **PO039781**

Supplier: ATG001-VC
A.T.G. Industries Inc
731 INDUSTRIELLE ROAD
ROCKLAND
ON
K4K 1T2 Canada
Phone: 613-446-4544
Fax: 613-446-4556

Attention: Lalande, Marc-Andre

Ship To: 1270 Aberdeen Street
Hawkesbury
ON
K6A 1K7 Canada
Phone: 613-632-5200

PO No: PO039781

PO Date: 5/2/18

Due Date: 5/4/18

Purchase Order

Revision:

Revision Date:

Ship-To Contact: Phone:

Via: Ground

Pymt Terms: Net 30

Freight Terms:

Special Comments:

Items

Line Item	Job	Part	Description	Status	Due Date	Order Quantity	Received Quantity	Balance	Unit Price (CAD)	Extended Price
1	175554	644.4120	Spacer, Crosstube 1-ISSUE P/O TO ATG: _____ 2-Anodize Black -MPP-172 Section 2.1 -Hard Anodize IAW Mil-A-8625 Type 3 Class 2 3-Certification of Conformity is required	Firmed	5/4/18	10 pcs	0 pcs 10x	10 pcs	\$8.38/pcs AT 18/05/18	\$83.80
2	175560	644.4122	EC145 Fwd Crosstube Bushings 1-ISSUE P/O TO ATG: _____ 2-Anodize Black -MPP-172 Section 2.1 -Hard Anodize IAW Mil-A-8625 Type 3 Class 2 3-Certification of Conformity is required	Firmed	5/4/18	10 pcs	0 pcs 10x	10 pcs	\$8.38/pcs AT 18/05/18	\$83.80
3	175561	644.4123	EC145 Fwd Crosstube Bushing 1-ISSUE P/O TO ATG: _____ 2-Anodize Black -MPP-172 Section 2.1 -Hard Anodize IAW Mil-A-8625 Type 3 Class 2 3-Certification of Conformity is required	Firmed	5/4/18	10 pcs	0 pcs 10x	10 pcs	\$8.38/pcs AT 18/05/18	\$83.80

DAS
38
9-89

Page 1 of 1